



Attorney's Docket No.: 02103-393001 / AABOSS27

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Henricksen et al. Art Unit : 2644  
Serial No. : 09/688,525 Examiner : Justin I. Michalski  
Filed : October 16, 2000  
Title : LINE ELECTROACOUSTICAL TRANSDUCING

Hon. Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION UNDER RULE 132

Kenneth D. Jacob declares I am *Chief Engineer and* Director, Live Music Technology Group, Bose Corporation, and further declare as follows:

*OK*  
*11/17/05*

1. There is attached as Exhibit A my curriculum vitae which supports my qualifications for making this declaration. The statements therein are true to the best of my knowledge and belief.

2. There is attached as Exhibit B based on records kept in the ordinary course of business by Bose Corporation, sales of the Bose Cylindrical Radiator loudspeaker system made and sold by the assignee of the above-identified application and corresponding substantially to the invention shown, described and claimed in claims 2-10 in the above-identified application.

3. The commercial success demonstrated by attached Exhibit B is directly attributable to the invention of claims 2-10 and specifically including a first loudspeaker array with at least six acoustic drivers having a diameter less than three inches positioned in the enclosure in a first substantially straight line substantially regularly spaced so that the edges of the radiating surfaces are less than two inches apart and constructed and arranged to radiate sound in a predetermined frequency range that is at least six octaves. This claimed invention is characterized by substantially uniform radiation horizontally over a broad range of frequencies and narrowly in the vertical direction so as to substantially uniformly illuminate the listening area of a relatively large room over a broad range of frequencies.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the above address, or being facsimile transmitted to the USPTO, on the date indicated below.

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*Charles Hieken*

Charles Hieken

Typed or Printed Name of Person Signing Certificate

The feature of having the second loudspeaker array detachable, secured to the first loudspeaker array in a manner that extends the first substantially straight line so that the height of the loudspeaker is increased and so that the width of the loudspeaker remains constant enables the resultant assembly to be readily assembled and disassembled by a using musician and easily transported.

4. I have reviewed Ferren U.S. Patent No. 5,802,190 and Edger U.S. Patent No. 5,588,063 and the subject matter as a whole of the invention of claims 2-10, differs sufficiently from what is disclosed in these patents so that the subject matter as a whole would not have been obvious to me at the time the invention of these claims was made or in my opinion to one of ordinary skill in the art of designing loudspeaker systems. Neither patent discloses a frequency range of at least six octaves. For that reason alone, it is impossible to combine the references to meet the limitations of claims 2-10. While I and those of ordinary skill in the art have known for many years that the audible frequency range is generally regarded as between 30Hz and 16KHz, this knowledge does not disclose the feature set forth in the rejected claims of the recited structure including at least six drivers having the frequency range of at least six octaves.

5. I have also examined Humphrey U.S. Patent No. 4,797,633 applied in rejecting claim 10 as a tertiary reference with Ferren as a primary reference and Edger as a secondary reference and believe it is unnecessary to comment on this patent since claim 2 is primarily rejected on Ferren and Edger, and, as indicated above, the differences between the subject matter of claim 2, upon which claim 10 depends, and the subject matter of Ferren and Edger are such that the subject matter as a whole would not have been obvious to a person of ordinary skill in the art at the time the invention of this claim was made for reasons set forth above.

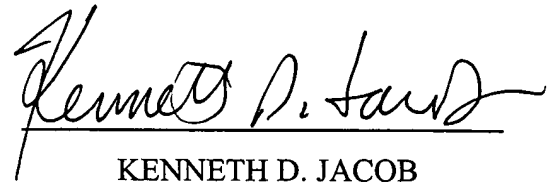
6. There is attached as Exhibit C a paper I authored entitled "Applying the Benefit of Unamplified Music to Performance with Amplification." The statements there are true to the best of my knowledge and belief. Pages 39 and 40 describe and illustrate the advantageous properties of the invention of claims 2-10.

Being warned that willful false statement and the like are punishable by fine or imprisonment or both (18 U.S.C. 1001) and may jeopardize the validity of any patent granted on the above-identified application, all statements made of my own knowledge are true and all statements made on information belief are believed to be true.

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Attachments: Exhibit A, Exhibit B and Exhibit C

# EXHIBIT A

## Kenneth D. Jacob

Ken Jacob is Director & Chief Engineer of the Bose Live Music Technology Group. He holds engineering degrees from the University of Minnesota and the Massachusetts Institute of Technology.

At MIT, Mr. Jacob pursued a multi-disciplinary degree in acoustics, and studied under Professor Amar Bose. Ken joined Bose Corporation in 1984. His thesis described a new acoustic emission system for superconducting magnets.

He was the acoustic engineer of the Bose 102<sup>®</sup> and Bose Acoustic Wave<sup>®</sup> cannon loudspeakers. He is the project engineer and a major technical contributor to Bose's sound system design program, Modeler<sup>®</sup> design program. He was the project leader of the patented Auditorer<sup>®</sup> audio demonstration system developed by Bose to allow professional sound system designers to listen to designs using only a computer model. He conceived and was a technical adviser to the patented Bose Panaray<sup>®</sup> 502 sound system.

In research, Mr. Jacob has performed basic research in the area of predicting the speech intelligibility of professional sound systems, and has published numerous papers in the AES Journal on this subject. He also led a research project in predicting the polar performance of speaker arrays, and has published a paper in the AES on this subject. One of his papers was named by the AES as the best paper by an author under 35 years of age for two Journal years running. He served as Chairman and Co-Chairman of the AES Technical Committee on Acoustics and Sound Reinforcement for ten years.

Ken spent ten years with colleague Cliff Henricksen researching the root causes of complaints by musicians and audience members about amplified musical performances. Their work eventually led to an entirely new and critically acclaimed approach to amplified music. A new loudspeaker, the Cylindrical Radiator<sup>®</sup> loudspeaker, formed the basis of the approach, which in a short time has been adopted by musicians throughout North America and Europe.

### Education:

University of Minnesota	1981	B.I.S. Acoustics
Massachusetts Institute of Technology	1984	M.S. Mechanical Engineering

### Bose Research and Development:

- Designed the world's first high fidelity flush mounting commercial loudspeaker, the Bose 102<sup>®</sup>.
- Designed the Bose Acoustic Wave<sup>®</sup> cannon, a 4 meter pipe-shaped speaker using patented technology to deliver powerful, deep bass in large venues including cinemas and auditoriums.
- Led the research leading to a patent with other Bose researchers on the Bose 502A<sup>®</sup> loudspeaker, the world's first constant beamwidth high-bandwidth, cone-based speaker for professional use.
- Completed more than 5 years of basic research leading to a new, proven method of predicting the speech intelligibility of sound systems in large public spaces.
- Project engineer and leader of the research team that developed Bose Modeler<sup>®</sup>, a computer program capable of predicting the acoustic performance of sound systems in public places and places of business.
- Project engineer and leader of the research team that developed Bose Auditorer<sup>®</sup>, a system that allows architects, acoustic designers, and clients to precisely hear the sound of a proposed design before it is built.
- Member of the research team successful in developing the first handheld, wireless, accurate speech intelligibility meter, now patented.

### **Professional Societies:**

Chairman, Audio Engineering Society Technical Committee on Acoustics and Sound Reinforcement 1986- 1995

### **Patents, Awards and Listings:**

United States Patent 5,309,518, Multiple Driver Electroacoustic Transducing.

United States Patent 6,792,404 B2, STI Measuring

Recipient, 1990 Audio Engineering Society Fellowship Award, "For his continued investigations and advancements in sound system intelligibility"

Recipient, 1991 and 1992, Best Paper by an Author Under 35 years of Age, Journal of the Audio Engineering Society

Winner, 1995 Discover Technology Award, for the innovation and development of Auditor audio demonstration technology

### **Selected Publications:**

Jacob, Kenneth D. "Acoustic Emission from Large Superconducting Magnets for Fusion," MIT Masters thesis.

Jacob, Kenneth D. "Sound Systems in Three Reverberant Ice Arenas at the 1988 Winter Olympics." Meeting of the AES International Conference on Sound Reinforcement. Nashville, Tennessee, May 1988.

Jacob, Kenneth D. and Thomas K. Birkle. "The Latest Advances in Predicting Sound System Performance in Real Spaces: Combining Intuitive User Interface with Acoustically Relevant Output." Meeting of the AES International Conference on Sound Reinforcement. Nashville, Tennessee, May 1988.

Jacob, Kenneth D. "Correlation of Speech Intelligibility Tests in Reverberant Rooms with Three Predictive Algorithms." J. Audio Engineering Society, vol. 37, no. 12, pp. 1020-1029, December 1989.

Jacob, Kenneth D. and Thomas K. Birkle. "Prediction of the Full-Space Directivity Characteristics of Loudspeaker Arrays." J. Audio Engineering Society, vol. 38, no. 4, pp. 250-258, April 1990.

Jacob, Kenneth D., Birkle, Thomas K. and Christopher B. Ickler. "Accurate Prediction of Speech Intelligibility without the Use of In-Room Measurements." J. Audio Engineering Society, vol. 39, no. 4, April 1991.

Jacob, Kenneth D., Jørgensen, Morten and Christopher B. Ickler. "Using Subject-Based Testing to Evaluate the Accuracy of an Audible Simulation System." Meeting of the AES. New York, New York, October 1993.

Sound System Design Guide: A Systematic Approach to Designing Sound Systems, with Kurt Wagner, 1994.

Jacob, Kenneth D., "Understanding Speech Intelligibility and the Fire Alarm Code" National Fire Protection Association Congress, Anaheim, 2001.

Jacob, Kenneth D., "Understanding Speech Intelligibility and the Fire Alarm Code" National Fire Protection Association Congress, Anaheim, 2001.

Steeneken, H., Verhave, J., McManus, S., Jacob, K. "Development of an Accurate, Handheld, Simple-to-use Meter for the Prediction of Speech Intelligibility," Proceedings of the Institute of Acoustics Reproduced Sound Conference, Stratford-on-Avon, Nov. 2001.

Past, Present and Future of the Speech Transmission Index, published by TNO Human Factors, 2002, Chapter 7. Jacob, K., McManus, S., Steeneken, H., Verhave, J., "Development of an Accurate, Handheld, Simple-to-use Meter for the Prediction of Speech Intelligibility".

"Applying the benefits of unamplified acoustic music to performances with amplification", Bose publication; 2003.

# EXHIBIT B

Product Family		MA12
Fiscal year	Fiscal Month	Sales Base UOM
2002	6	0
	7	0
	8	14
	9	1,051
	10	568
	11	311
	12	724
	Fiscal Year Total	2,668
2003	1	324
	2	408
	3	404
	4	400
	5	386
	6	424
	7	402
	8	424
	9	496
	10	278
	11	286
	12	713
	Fiscal Year Total	4,945
2005	1	379
	2	385
	3	481
	4	422
	5	355
	6	503
	7	466
	8	741
	9	951
	10	370
	11	583
	12	679
	Fiscal Year Total	6,315
2004	1	288
	2	302
	3	428
	4	376
	5	388
	6	633
	7	529

	8	453
	9	557
	10	313
	11	442
	12	740
	Fiscal Year Total	5,449
2006	1	484
	2	585
	3	571
	4	519
	5	363
	Fiscal Year Total	2,522
<b>Overall Result</b>		<b>21,899</b>